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CLAIMS

[Claim]

[Claim 1] Ultraviolet-rays prevention manipulation **** characterized by having the resin coat which is the **** used in part at least about the hollow fiber which has the penetration slot which consists of a fiber-forming nature polymer, and which is penetrated from a fiber front face to a centrum, and carried out distributed inclusion of the ultraviolet-rays reflective agent at least on one side of ****.

[Claim 2] **** of the claim 1 publication to which a resin coat carries out distributed inclusion of an ultraviolet-rays reflective agent and the ultraviolet ray absorbent.

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DETAILED DESCRIPTION

[Detailed description]

[0001]

[Field of the Invention] this invention is excellent in the absorptivity which has an ultraviolet-rays shielding effect, and relates to lightweight ****.

[0002]

[Prior art] Synthetic fibers, such as polyester and a polyamide system, are lacking in absorptivity, and the enhancement is desired.

[0003] In order to improve absorptivity, the hollow fiber which has the penetration slot which consists of a fiber-forming nature polymer, and which is penetrated from a fiber front face to a centrum is proposed by the Provisional-Publication-No. 169817 [56 to] official report, and the Japanese Patent Publication No. 37203 [60 to] official report. These hollow fibers are excellent in absorptivity ability, and since they are lightweight, they are suitable to use for **** for garments.

[0004] However, there are the following troubles in the above-mentioned fiber. That is, polyester and the fiber of a polyamide system have the ultraviolet-rays shielding effect of not sufficient thing. However, compared with the usual fiber of the same cross section (size) which consists only of the polymer section, as shown in drawing 2, when the sum of fiber-forming nature polymer section A and centrum B considers as the appearance cross section (size) of fiber, since there are few polymer components, the above hollow fibers have few ultraviolet-rays shielding effects. And under direct rays, ultraviolet rays are made to penetrate and suntan by daylight is produced in many cases.

[0005]

[Object of the Invention] However, if it is going to prevent transparency of ultraviolet rays and texture is thickened, practical problems, such as a weight not only increasing, but spoiling fashionability, will be produced.

[0006] On the other hand, although giving the microcapsule containing an ultraviolet ray absorbent and an ultraviolet ray absorbent to **** is also considered, when it only gives ****, a problem will be produced in wash endurance and the goods itself will turn into a defective article. Furthermore, an ultraviolet ray absorbent deteriorates by daylight and has the problem that an ultraviolet-rays shielding effect falls gradually by use over a long period of time.

[0007] As a result of repeating a research zealously for the purpose of giving the durable ultraviolet-rays transparency prevention effect to **** in view of the above situations, this invention person etc. finds out new ultraviolet-rays transparency prevention manipulation **** by which many problems which the above-mentioned preexisting method has were *****ed entirely, and completes this invention.

[0008] The purpose of this invention is to offer ultraviolet-rays transparency prevention manipulation **** which has the light resistance which stood high, and wash-proof nature.

[0009]

[The means for solving a technical problem] The configuration of this invention for attaining the above-mentioned purpose is as follows. That is, it is **** which consisted of a hollow fiber which has the penetration slot which consists of a fiber-forming nature polymer, and which is penetrated from a fiber front face to a centrum, and is ultraviolet-rays prevention manipulation **** characterized by having the resin coat which carried out distributed inclusion of the ultraviolet-rays reflective agent at least on one side of ****.

[0010] The example of representation of the manufacturing method of the hollow fiber which has the penetration slot used for this invention is as follows. Make the heart and sheath type compound yarn like drawing 1 first, subsequently a heart component is melted or decomposition removed, and a hollow fiber like drawing 2 is obtained. The rate of hollow of the hollow fiber obtained and the width of face of a penetration slot can be arbitrarily adjusted in the case of a **** type compound spinning.

[0011] The spinning material used for a core part in a compound spinning is not limited especially possible [a compound spinning] that what is necessary is just conveniently [a next heart polymer elimination process]. As a thing convenient for an elimination process, the polymer which can melt with water, the polymer which can decompose and melt with an alkaline-water solution, the polymer which can be soluble in an acid, the polymer which can melt by the non-drainage-system solvent are raised, and especially the thing in which lysis or decomposition with water and an alkaline-water solution is possible is advantageous.

[0012] Although masses [the polymer which can melt with water], water-soluble polyamides, such as polyvinyl system polymers, such as polyalkylene-oxide system polymers, such as a polyethylene oxide, a polyethylene oxide / polypropylene-oxide copolymers, those derivatives, and a segment copolymer of other polymer (for example, polyester or polyamide) segments, polyvinyl alcohol, a polyvinyl pyrrolidone, and a polyacrylate, poly-screw propoxy *****, and ***** propoxy piperazine *****, etc. are raised, for example.

[0013] As a polymer in which decomposition and lysis are possible, fiber-forming nature polyester, such as a polyethylene terephthalate, a polybutylene terephthalate, and polyethyleneoxy benzoate, and those copolymers, the denaturation field, etc. are raised with an alkaline-water solution.

[0014] Especially 1 - 60% (weight) grade, the thing which copolymerized polyalkylene oxides five to 20% most preferably two to 30%, the mixed thing, or the thing which copolymerized 5-sulfoisophtharic acid specific salt three to 10% is preferably decomposed easily into the above-mentioned polyester by the alkaline-water solution. Similarly, what mixed the aliphatic polyester of the low melting point (200 degrees C or less) about 5 to 50% to the aromatic polyester is very suitable as a heart component.

[0015] As an example of the polymer which can be soluble in an acid, polyamides, such as 6 nylon, 66 nylon, 610 nylon, 612 nylon, 12 nylon, and those copolymerization objects, are raised.

[0016] As an example of a non-drainage-system solvent, aromatic compounds, such as chlorides, such as a trichloroethylene and a perchloroethylene, toluene, and a xylene, a dimethyl formamide, an acetone, etc. are raised, and polyethylene, polypropylene, polystyrene, a polyvinyl chloride, a polyacrylonitrile system polymer, etc. are raised as an example of the polymer which can be soluble in these.

[0017] The polymer used for a sheath fraction is the thing of fiber-forming nature, and are a polyester system, a polyamide system, a polyacrylonitrile system, a polyurethane system, etc.

[0018] The rate of hollow of the fiber used for this invention can be arbitrarily chosen according to the purpose of use. For example, ten to 60%, the rate of hollow can be made into 40 - 80% obtaining usual water absorbing power, for obtaining a large water absorption particularly.

[0019] The absorptivity of the fiber used for this invention is acquired by this centrum and the penetration slot. That is, water goes into the centrum of fiber through a penetration slot from a fiber front face, and is held there. Moreover, through a penetration slot, it can emit outside or the water held at the centrum can be evaporated. Therefore, generally, water absorption capacity is, are proportional to the size of hollow, i.e., the rate, of a centrum, and water absorption or a water-drainage speed is proportional to the width of face of a penetration slot.

[0020] the distinction with a centrum and the external world disappears and **** in the holding power of water, when the width of face of a penetration slot becomes large too much, although the width of face of a penetration slot becomes easy [transit of water] so that it is large -- it is divided therefore, the width of face of a penetration slot -- the diameter (in the case of a noncircular section, it is made into the diameter of circle of this area) of a centrum -- the parvus -- things are desirable. The width of face of a penetration slot is average, and 0.5 micrometers or more are suitable for it (an upper limit is usually about 1/3 diameter of fiber). The transit speed of the parvus and water may become low and the width of face of a penetration slot may not be so desirable.

[0021] The cross section of the heart and the sheath type bicomponent fiber which can be used for this invention has various type composite -- said -- even when it is mental -- eccentricity ---like . The heart is good, even when it is circular and it is un-circular, and even when a sheath is circular similarly and it is un-circular, it is good. Moreover, one piece or plural are sufficient as the heart.

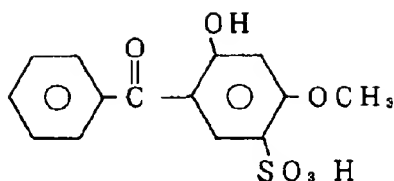
[0022] Other synthetic fibers, a semi-synthetic fiber, a natural fiber, etc. and mix spinning and the thing by which the union was carried out are sufficient as **** used in this invention in part, using the above hollow fibers at least. It is better to use a hollow fiber 30% or more preferably at least 20% into ****, in order to exhibit the characteristic feature of a hollow fiber. Textiles, knitting, a nonwoven fabric, etc. are mentioned as ****.

[0023] Next, an ultraviolet-rays transparency prevention manipulation is explained. Generally, although it is well known that it is a 200-400nm electromagnetic wave with wavelength shorter than a visible ray, physical and a biological operation change with the wavelength fields, and it ****s ultraviolet rays to short wavelength ultraviolet rays (UV-C:200-290nm), medium wave length ultraviolet rays (UV-B:290-320nm), and ultraviolet A (UV-A:320-400nm). Among these, it is UV-A and UV-B 290nm or more that UV-C has a bad influence to a human body with a solar beam of light since most is absorbed in the atmospheric air and does not reach on the ground. Especially UV-B causes the acute erythema generation and the acute pigmentation operation by inflammation, and it is said that it is very detrimental and the operation to the human body reaches by 1000 times [no less than] the UV-A.

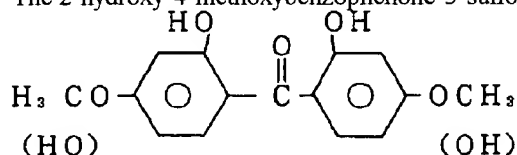
[0024] Therefore, the ultraviolet-rays reflective agent and ultraviolet ray absorbent to use are effective in UV-B at least among such wavelength, and must use a human body, i.e., the safe thing which does not start allergy etc. to human being's skin. Moreover, because of the application to ****, what has few stain, such as yellowing, and what has a few fall of transparency are desirable.

[0025] As such an ultraviolet-rays reflective agent, the particle of metallic oxides, such as titanium oxide (0.005-0.02micro) and a zinc oxide, is raised preferably 0.001-0.2micro of particle diameters, for example.

[0026] Moreover, as such an ultraviolet ray absorbent, simple substances or those mixture, such as a p-aminobenzoic-acid derivative, a **** acid derivative, salicylic acid derivatives, a cinnamic acid derivative, a benzophenone derivative, and a benzotriazol derivative, can use it suitably, for example. And a benzophenone derivative is desirable especially in this etc., and they are specifically 2-ethyl ****-p-dimethylamino benzoate, an ethylhexyl-p-methoxy **** mate, and the following general formula [-izing 1].



The 2-hydroxy-4-methoxybenzophenone-5-sulfonic acid and [-izing 2] which are come out of and shown



It comes out and the 2 and 2'-dihydroxy -4, a 4'-dimethoxy benzophenone, etc. which are shown are mentioned.

[0027] 0.5 - 8% of the **** weight of the amount of grants of such an ultraviolet-rays reflective agent or an ultraviolet-rays reflective agent, and an ultraviolet ray absorbent is desirable. If fewer than 0.5%, the ultraviolet-rays transparency prevention effect is inadequate, and when exceeding 8% on the other hand, it is not economical considering an effect.

[0028] Although the effect which was excellent even if it used the ultraviolet-rays reflective agent independently is demonstrated, if an ultraviolet ray absorbent is used together, a large effect will be acquired by the little amount used according to the synergistic effect.

[0029] Although an ultraviolet ray absorbent deteriorates by daylight, it is suitable for especially the Japanese umbrella that can prevent a degradation, and it continues and is used for a long period of time by using an ultraviolet-rays reflective agent together.

[0030] In this invention, the ultraviolet-rays reflective agent and the ultraviolet ray absorbent are distributed by the resin coat.

[0031] As a resin used in this invention, a glyoxal resin, an amino-plast resin, acrylic resin, a urethane resin, etc. are mentioned.

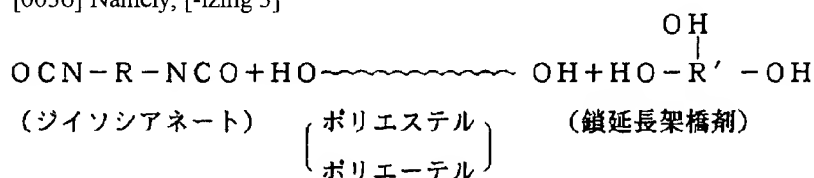
[0032] As a glyoxal resin, dimethylol dihydroxyethylene urea, tetrapod methylol glycol *****, etc. are mentioned.

[0033] As an amino-plast resin, although mixture, such as a melamine formalin system resin, a ***** formaldehyde resin, a formaldehyde resin, an ethylene formaldehyde resin, other N-methylol resins, N-methylol ether resin, and this, is mentioned, a melamine formalin system resin is desirable in respect of hand endurance.

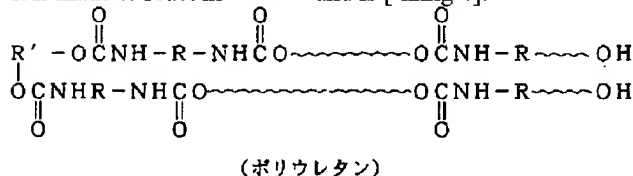
[0034] As an acrylic resin ** methyl acrylate, ethyl acrylate, n propylacrylate, isopropyl acrylate, n butyl acrylate, isobutyl acrylate, cyclohexyl acrylate, benzyl acrylate, 2-ethylhexyl acrylate, laurylacrylate, Tridecyl acrylate, stearylacrylate, methoxy ethyl acrylate, ethoxy ethyl acrylate, butoxy ethyl acrylate, methoxy polyethylene-glycol acrylate, 2 hydroxyethyl acrylate, 2 hydroxy propylacrylate, The mixed emulsion of homopolymers, such as 2 hydroxy 3 chloropropyl acrylate, 1, independent or the copolymer emulsion of 4 butylene-glycol monoacrylate, or this, can be mentioned.

[0035] Furthermore, as a urethane resin, it is polyurethane resins, such as an ether system and an ester system, and is usually obtained by the well-known following technique as this polyurethane emulsion.

[0036] Namely, [-izing 3]



It is made to react in ***** and is [-izing 4].



It manufactures by the ***** system, this is usually emulsion-ized with a suitable well-known emulsifier, and solvents are collected suitably. Moreover, well-known N of a polyurethane elastomer and N' dimethylformamide solution can usually also be used.

[0037] 0.3 - 20% of the **** weight of the amount of grants of such a resin is desirable. If fewer than 0.3%, endurance is inadequate, and a hand becomes hard and is not desirable when exceeding 20% on the other hand.

[0038] You may add a thickener etc., in case the softening agent for adjusting the cross linking agent for raising the intensity of a coat and a hand to the processing liquid which makes a principal component an ultraviolet-rays reflective agent and a resin or an ultraviolet-rays reflective agent, an ultraviolet ray absorbent, and a resin in this invention, and coating are performed.

[0039] The processing liquid which makes a principal component such an ultraviolet-rays reflective agent and a resin or an ultraviolet-rays reflective agent, an ultraviolet ray absorbent, and a resin is given to **** by the coating method, the padding

method, the spray method, etc., and is heat-treated after xeransis. When durability is needed by the umbrella cloth etc., the coating method is desirable and a knife coating machine, an air doctor coating machine, a blade coating machine, a reverse roll coater, a gravure coating machine, a kiss coating machine, etc. are specifically used. About 1 - 3 minutes of xeransis are desirable at 90-130 degrees C, and about 2 - 5 minutes of heat treatment are desirable at 140-170 degrees C.

[0040] Although this invention persons found out the ultraviolet-rays transparency prevention manipulation used for this invention in order that the ultraviolet-rays shielding effect of the hollow fiber which has a penetration slot might improve a scarce thing, they were so small that ultraviolet-rays permeability was surprised compared with what gave the same ultraviolet-rays transparency prevention manipulation as **** using the usual fiber with the equal appearance size of the same polymer. [of ultraviolet-rays transparency prevention **** of this invention] Since the surface area of the hollow fiber used for this invention is larger than usual fiber, this is considered that the effect of an ultraviolet-rays transparency manipulation is size.

[0041]

[Effect of the invention] It is suitable to have the outstanding absorptivity and the outstanding ultraviolet-rays shielding effect, and for it to be lightweight, for wash-proof nature also have many characteristic features of being good, moreover, and for **** of this invention apply them to a shirt, a blouse, sportswear, a hat, a Japanese umbrella, etc.

[0042] Furthermore, since the hollow fiber which has a penetration slot is used for **** used for this invention and it can give a processing agent effectively in post processings, such as a water repellent finishing, an antielectric manipulation, and a soil resistant finish, it is also very useful to use these post processings together.

[0043]

[Example] Although an example is shown below and this invention is explained to it, of course, this invention is not limited to this. In the example, the ultraviolet-rays transparency prevention effect was evaluated by measuring UV transmittance (360nm (UV-A) and 305nm (UV-B)) using Shimadzu recording-spectrophotometer UV2100. Wash is JIS. According to the L-0217103 method, it carries out 10 times, and a fading test is JIS. L-0842 It carried out according to the carbon arc process.

[0044] "The sucking quantity of water" which shows the diffusibility of the water which is one of absorptivity was measured according to the Bally Lec method (however, the measured value of 5 minutes after was shown). Moreover, the water retention value which shows the holding power of water was under the water of a room temperature for 60 minutes, and with the dehydrator of a home washing machine, the indirect-desulfurization water of it was carried out for 3 minutes, and it was measured.

[0045] The melt spinning was performed by junction proportion copolymerization PET:6 nylon = 1:2, having used as the heart the copolymerization polyethylene terephthalate (it being described as copolymerization PET below) containing 17% of a polyether segment which carried out copolymerization of the polyethylene glycol of example 1 average molecular weight 8000, and obtained it, and having used 6 nylon as the sheath, it extended 3.8 times, and the compound yarn F1 of 75 deniers / 24 filament was obtained.

[0046] This compound yarn F1 was used for warp and the woof, the weaving of the plain weave fabric was carried out, and it considered as textiles 1. The obtained textiles 1 were processed for 60 minutes with 4% of sodium hydroxides, and the 80-degree C alkaline-water solution, and copolymerization PET of the core part of compound yarn F1 was removed. The cross section of the yarn after processing was what is shown in drawing 2.

[0047] Moreover, as an example of a comparison, the spinning of the yarn of 75 deniers / 24 independent filament was carried out 6 nylon, this was used for warp and the woof, the weaving of the plain weave fabric was carried out similarly, textiles 2 were obtained, and refinement processing was performed.

[0048] It passed through each density after processing of textiles 1 and 2, and it was 105 [/] and 87 **s [/inch] inch.

[0049] Subsequently, the following ultraviolet-rays transparency prevention manipulations were performed. Padding of the aqueous solution shown below was carried out, it dried for 2 minutes at 120 degrees C after **** with 80% of the rates of pickup, heat treatment was performed for 3 minutes at 150 degrees C, what processed textiles 1 with processing liquid (A) was set to textile 1A, and what was processed with processing liquid (B) was set to textile 1B. Similarly, what processed textiles 2 with processing liquid (A) was set to textile 2A.

[0050]

Processing liquid (A)

Titanium oxide (particle diameters 0.007-0.020micro) 2 % of the weight ***** cell clear binder 3301 2 % of the weight (the Dainippon Ink acrylic binder, 18% of solid contents)

[0051]

Processing liquid (B)

Zinc oxide (particle diameters 0.005-0.015micro) 2 % of the weight ***** cell clear binder 3301 2 % of the weight (the Dainippon Ink acrylic binder)

[0052] The physical properties of the obtained textiles are shown in Table 1. In order to investigate the endurance of the ultraviolet-rays prevention effect, it measured also about the ten wash and fading-test back.

[0053]

[Table 1]

織物 No	1	1A	1B	2	2A
紫外線透過防止加工	ナシ	アリ	アリ	ナシ	アリ
備考	比較例	本発明	本発明	比較例	比較例
紫外線透過率 (%) UV-A (360nm)	初期	8.6	9.0	19.7	10.8
	洗濯10回後	8.2	8.7	20.1	10.2
	耐光試験 80時間後	8.4	8.7	20.2	11.1
紫外線透過率 (%) UV-B (305nm)	初期	6.2	6.3	14.2	8.1
	洗濯10回後	5.9	6.2	13.8	7.7
	耐光試験 80時間後	6.4	5.8	13.7	7.9
バイレック揚水長 (m/m)	74	69	63	38	33
保水率 (%)	55.2	49.6	45.5	18.7	18.4

[0054] For the effect of a manipulation, ultraviolet-rays permeability is [the textiles 1A and 1B of this invention] the parvus in size so that clearly from Table 1. The textiles 2 and 2A using 6 usual nylon have few effects of an ultraviolet-rays transparency prevention manipulation. Moreover, textiles 1A and 1B showed the outstanding water diffusibility and the outstanding water retention.

[0055] The melt spinning was performed by junction proportion copolymerization PET:6 nylon =1:1, having used as the heart copolymerization PET which carries out copolymerization of the polyethylene glycol of example 2 average molecular weight 4000, and was obtained [polyethylene glycol / % / 4.3 mol] in 8% and 5-sulfoisophtharate sodium, and having used 6 nylon of an example 1 as the sheath, it extended 3.8 times, and the compound yarn of 75 deniers / 24 filament was obtained. It made [whose cross section of the obtained compound yarn was] this like drawing 1 compound yarn F2.

[0056] This compound yarn F2 was used for warp and the woof, the weaving of the plain weave fabric was carried out, and it considered as textiles 3. The obtained textiles 3 were processed for 30 minutes with 1% of sodium hydroxides, and the 98-degree C alkaline-water solution, and copolymerization PET of the core part of compound yarn F2 was removed. It passed through the density of the textiles 3 after processing, and they were 104 [/] and 86 **s [/inch] inch.

[0057] Subsequently, the following ultraviolet-rays transparency prevention manipulations were given. In addition, the contrast was taken as the textiles 2 of an example 1.

[0058] Padding of the aqueous solution shown in the textiles 3 and the textiles 2 below was carried out, it dried for 2 minutes at 120 degrees C after **** with 80% of the rates of pickup, and heat treatment was performed for 3 minutes at 150 degrees C.

[0059]

Processing liquid (C)

Titanium oxide (particle diameters 0.007-0.002micro) 1 % of the weight ***** life LP-200 1 % of the weight (ultraviolet ray absorbent made from Japanese Flower Chemical industry)

***** cell clear binder 3301 2 % of the weight (the Dainippon Ink acrylic binder)

[0060]

Processing liquid (D)

***** life LP-200 1 % of the weight (ultraviolet ray absorbent made from Japanese Flower Chemical industry)

***** cell clear binder 3301 2 % of the weight (the Dainippon Ink acrylic binder)

[0061] What processed textiles 3 with processing liquid (C) was set to textile 3C, and what was processed with processing liquid (D) was set to textile 3D. What processed textiles 2 with processing liquid (C) similarly was set to textile 2C.

[0062] The physical properties of the obtained textiles are shown in Table 2. In order to investigate the endurance of the ultraviolet-rays prevention effect, it measured also about the wash and fading-test back.

[0063]

[Table 2]

織物 No	3	3 C	3 D	2	2 C
紫外線透過防止加工	ナシ	アリ	アリ (紫外線 吸収剤のみ)	ナシ	アリ
備考	比較例	本発明	比較例	比較例	比較例
初期	29.2	2.5	3.9	20.4	3.8
洗濯10回後	28.1	2.6	4.1	19.3	3.9
耐光試験 160時間後	29.5	2.9	18.8	19.9	3.3
初期	21.6	1.6	2.1	15.0	2.5
洗濯10回後	20.4	1.3	2.2	13.3	3.0
耐光試験 160時間後	21.2	1.6	14.4	14.1	2.4
紫外線透過率 (%) UV-A (360nm)					
紫外線透過率 (%) UV-B (305nm)					

[0064] Since textile 3C of this invention is using together the ultraviolet-rays reflective agent (titanium oxide) and the ultraviolet ray absorbent so that clearly from Table 2, ultraviolet-rays permeability is very the parvus. Moreover, compared with textile 2C, the effect of an ultraviolet-rays transparency prevention manipulation is size. On the other hand, textile 3D by manipulation of only an ultraviolet ray absorbent had a degradation of the ultraviolet rays by light, and endurance was scarce.

[0065] The melt spinning was performed by junction proportion copolymerization PET:PET=1:1, having used as the heart copolymerization PET which carries out copolymerization of the polyethylene glycol of example 3 average molecular weight 4000, and was obtained [polyethylene glycol / % / 4.3 mol] in 8% and 5-sulfoisophtharate sodium, and having used the polyethylene terephthalate (it being described as PET below) as the sheath, it extended 3.5 times, and the compound yarn of 100 deniers / 48 filament was obtained. It made [whose cross section of the obtained compound yarn was] this like drawing 1 compound yarn F3.

[0066] This compound yarn F3 was used for warp and the woof, the weaving of the plain weave fabric was carried out, and it considered as textiles 4. The obtained textiles 4 were processed for 20 minutes with 1% of sodium hydroxides, and the 98-degree C alkaline-water solution, and copolymerization PET of the core part of compound yarn F3 was removed.

[0067] Subsequently, the ultraviolet-rays transparency prevention manipulation was performed by the same processing liquid as an example 1, and the same technique, and what processed textiles 4 with processing liquid (A) was set to textile 4A. A result is shown in Table 3.

[0068]

[Table 3]

織物 No		4	4A
紫外線透過防止加工		ナシ	アリ
備 考		比較例	本発明
紫外線透過率 (%) (360nm)	初 期	25.6	4.1
	洗濯10回後	24.9	4.6
紫外線透過率 (%) (305nm)	初 期	2.7	2.5
	洗濯10回後	2.8	2.1
パイレック撻水長 (m/m)		83	81
保 水 率 (%)		55.4	58.8

[0069] Textile 4A of this invention had small ultraviolet-rays permeability, and absorptivity is good and it is said that it was excellent so that clearly from Table 3.

[0070]

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[Translation done.]